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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/703,264	10/31/2000	James C.H. Thi	37366/CAG/B600	9016

23363 7590 08/30/2005

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EXAMINER	
JAMAL, ALEXANDER	
ART UNIT	**PAPER NUMBER**
2643	

DATE MAILED: 08/30/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/703,264	THI ET AL.	
	Examiner	Art Unit	
	Alexander Jamal	2643	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 August 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-39* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-39* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Response to Amendment

1. Examiner notes that claims 1,11,22,33,37 have been amended.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. **Claims 1-32** rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Independent claims 11 and 22 both claim "a **single** adaptive filter having filter coefficients adapted to cancel an echo in a near end signal, the echo comprising an acoustic **and** electrical echo. Applicant's Fig. 8 discloses transfer functions 402,404 used to adapt to acoustical echo and transfer function 400, which is used to adapt to electrical echo. Examiner reads each transfer function as a separate filter. Applicant's specification does not enable the use of a **single** filter (transfer function) that will adapt itself so as to output an acoustic and electrical estimate. The output of applicant's transfer function (filter) 404 cannot be used to cancel the electrical echo that is cancelled via the use of transfer function (filter) 400.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. **Claims 1-3,6,8-10,33,36,37** are rejected under 35 U.S.C. 103(a) as being unpatentable over Eppler Jr. et al (5600714), and further in view of Finn (5706344).

As per **claim 1,** Eppler discloses an echo canceller (in a communications system) comprising a single adaptive filter 24 with a single transfer function formed with coefficients and adapted to cancel an echo in a near end signal (from microphone 12 in Fig. 1). The echo comprises part of a far end signal (signal from telephone system 34 in Fig. 1) (ABSTRACT). However, Eppler does not disclose that the echo comprises a portion of a secondary audio signal.

Finn teaches that in echo canceller systems, a far end signal (voice) and a secondary audio signal may be combined and output to the near end speaker and also output to an adaptive echo canceller in order to reduce the echo that both the voice and secondary audio signal produce in the near end microphone. Finn further teaches the means to combine the primary and secondary signals into a reference signal that is adaptively filtered, and then subtracted from the near end signal (FINN: Col 1 lines 23-44). It would have been obvious to one of ordinary skill in the art at the time of this

application that a secondary audio signal could be summed with the far end voice signal and the combination sent to the echo canceller (as well as the near end loudspeaker) in order to help remove the echo created in the near end microphone by both signals.

As per **claim 33,** claim 33 is rejected for the same reasons as claim 1 and the additional teachings from Finn that the primary and secondary signals are combined into a reference signal that is adaptively filtered, and then subtracted from the near end signal (FINN: Col 1 lines 23-44). Both Finn and Eppler disclose single filters implementing single adaptable transfer functions.

As per **claim 37,** claim 37 is rejected for the same reasons as claims 1 and 33. The combining, filtering and subtracting means are inherent to the system for the purpose of combining, filtering, and subtracting the primary and secondary signals as specified in the rejections of claim 33.

As per **claim 2,** Eppler discloses that the filter is a finite impulse response filter (Col 6 lines 25-36) (Col 7 lines 17-25).

As per **claim 3,** Eppler's FIR filter is implemented as a linear transversal filter as seen in Fig. 2 (Col 6 lines 38-51) (Col 7 lines 17-25).

As per **claim 6,** the system of Eppler and Finn inherently comprises a buffer coupled to (FINN: Fig. 1) the adaptive filter 24 via the receive path and amplifier 76 for the purpose of combining the primary and secondary signals as taught by Finn.

As per **claim 8,** In Eppler's echo canceller (Fig. 1) in view of Finn's teachings, the adaptive filter generates an echo estimate of the combined primary and secondary signals. The cancellation of the echo in the near end signal is a function of the estimated echo (Col 6 lines 37-51) (Col 7 lines 17-25).

As per **claim 9,** Eppler's echo canceller further comprises difference operator 20 (Fig. 1) to subtract the echo estimate from the near end (input waveform at terminal 38 in Fig. 1) signal (Col 6 lines 37-51) (Col 7 lines 17-25).

As per **claim 10**, In Eppler's echo canceller the output of difference operator 44 (Fig. 1) is fed-back to the echo canceller as an error signal for filter adaptation (Col 4 lines 20-39) (Col 6 line 65 to Col 7 line 16).

As per **claim 36,** In Eppler's method the adaptive filtering of the reference signal (the combination of two signals as taught by Finn) comprises generating an estimate of the echo as a function of the transfer function of the electrical (EPPLER: terminals 36, 38 Fig. 1) and acoustical (EPPLER: microphone 12 and speaker 58) echo paths (Col 6 lines 18-37) with echo cancellers 24,46. Additionally, any electrical echo that is not cancelled by canceller 46 will propagate through to canceller 24. As such, the echo estimate generated by canceller 24 will be a function of the electrical echo, with the electrical echo being a function of the electrical echo path.

6. **Claims 4,35,39** rejected under 35 U.S.C. 103(a) as being unpatentable over Eppler et al (5600714) and Finn (5706344) as applied to claims 1,33,37 above, and further in view of Sih (5732134).

As per **claims 4,35,39,** Eppler and Finn disclose applicant's echo canceller as per claims 1,33,37. However, they do not teach the echo canceller comprising double talk logic to control the filter adaptation based upon speech in the near end signal.

Sih teaches an adaptive echo canceller configuration where the far end speech is used as reference signal to cancel echo, a double talk condition will corrupt the echo path estimate unless the coefficient adaptation of the filter is disabled during the double talk (Col 1 lines 52-67). It would have been obvious to one of ordinary skill in the art at the time of this application to include double-talk logic (by detecting speech in both the near and far end) and cease coefficient adaptation in order to prevent the corruption of the echo path estimate.

7. **Claim 5** rejected under 35 U.S.C. 103(a) as being unpatentable over Eppler et al (5600714) and Finn (5706344) as applied to claim 1 above, and further in view of Sellenslagh et al. (3433898).

As per **claim 5,** Eppler and Finn disclose applicant's echo canceller as per claim 1. However, they do not teach the secondary tone comprising a pulse metering tone.

Sellenslagh teaches that in certain telephony systems, it is desirable to generate pulse metering tones to increment call cost meters (Col 1 lines 29-47). It would have been obvious to one of ordinary skill in the art at the time of this application to include

pulse metering as part of the terminal (and part of the secondary signal) for the purpose of controlling toll collection for services rendered to the user of the terminal.

8. **Claims 7,34,38** rejected under 35 U.S.C. 103(a) as being unpatentable over Eppler et al (5600714) and Finn (5706344) as applied to claims 1,6,33,37 above, and further in view of Hasegawa (5905717).

As per **claims 7, 34,38,** Eppler and Finn disclose applicant's echo canceller as per claims 1,6,33,37. However, they do not teach including a decimator to downsample the secondary audio signal to match that of the first.

Hasegawa teaches that in an adaptive filter echo canceller, the filter will be required to have a high-speed computation capability unless the rate of the input to the filter is converted (decimated) (Col 1 lines 15-27). It would have been obvious to one of ordinary skill in the art at the time of this application to include a decimator to down sample the primary signal, and also for the secondary signal to the same rate for the purpose of reducing the computation capability (and cost) required by the filter.

Response to Amendment

9. Applicant's arguments with respect to claims 1-39 have been considered but are moot in view of the new ground(s) of rejection.

10. Applicant's arguments filed 8-5-2005 have been fully considered but they are not persuasive.

As per applicant's arguments that a single transfer function implemented in a filter used to cancel acoustic and electrical echo is enabled by the specification (remarks pages 12-14), examiner disagrees. Applicant's description of Fig. 7 and Fig. 8 in the specification is incorrect (remarks page 12 last paragraph to page 13 first paragraph). Applicant states that the signal paths 400,402,404 of Fig. 8 are fed into the combiner 301 of Fig. 7. Examiner notes applicant's specification page 4 lines 25-30 which specifies that the parallel signal paths of Fig. 8 are modeled by the adaptive filter of Fig. 7. Examiner reads this as three filters (transfer functions) implemented in a single IC.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alexander Jamal whose telephone number is 571-272-7498. The examiner can normally be reached on M-F 9AM-6PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Curtis A Kuntz can be reached on 571-272-7499. The fax phone numbers for the organization where this application or proceeding is assigned are **571-273-8300** for regular communications and **571-273-8300** for After Final communications.

AJ
August 23, 2005

CURTIS KUNTZ
SUPERVISORY PATENT EXAMINER
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